VZCZCXRO9140
PP RUEHBI RUEHCI RUEHHM RUEHLH RUEHPB RUEHPW RUEHTM
DE RUEHNE #2996/01 3301322
ZNY SSSSS ZZH
P 251322Z NOV 08
FM AMEMBASSY NEW DELHI
TO RUEHC/SECSTATE WASHDC PRIORITY 4361
INFO RUCNCLS/ALL SOUTH AND CENTRAL ASIA COLLECTIVE
RUEHZN/ENVIRONMENT SCIENCE AND TECHNOLOGY COLLECTIVE
RUCNNSG/NUCLEAR SUPPLIERS GROUP COLLECTIVE
RUEHCG/AMCONSUL CHENNAI 3856
RUEHCI/AMCONSUL KOLKATA 3095
RUEHBI/AMCONSUL MUMBAI 2914
RUCPDOC/DEPT OF COMMERCE WASHDC
RUEAIIA/CIA WASHDC
RHEFDIA/DIA WASHDC
RUETIAA/DIRNSA FT GEORGE G MEADE MD
RUEIDN/DNI WASHINGTON DC
RHMFISS/NGIC INTEL OPS CHARLOTTESVILLE VA
RHEBAAA/DEPT OF ENERGY WASHINGTON DC
RHEHNSC/NSC WASHDC
RUEKJCS/JOINT STAFF WASHDC
RHHMUNA/HQ USPACOM HONOLULU HI
RHMFISS/HQ USSOCOM MACDILL AFB FL
RUEKJCS/SECDEF WASHDC
RUEHUNV/USMISSION UNVIE VIENNA 1675
RUCNDT/USMISSION USUN NEW YORK 7191

S E C R E T SECTION 01 OF 04 NEW DELHI 002996

SIPDIS

STATE FOR A/S SULLIVAN,
STATE FOR DAS DHENGEL, PSECOR, DHENRY
DEPT OF ENERGY FOR SJOHNSON, RBOUDREAU, MGILLESPIE
DEPT OF ENERGY IP FOR TCUTLER, CGILLESPIE

E.O. 12958: DECL: 11/25/2018
TAGS: BEXP ENRG ETTC IN KNNP PARM PREL TRGY TSPL
SUBJECT: BARC DIRECTOR BRIEFS NRC DELEGATION, PROVIDES TOUR
OF FACILITIES

REF: A. NEW DELHI 02985
¶B. NEW DELHI 02975
¶C. NEW DELHI 02960
¶D. NEW DELHI 02926

NEW DELHI 00002996 001.2 OF 004

Classified By: Science Counselor Satish Kulkarni for Reasons 1.4 (B and D)

¶1. (C) SUMMARY. On 21 November, Bhabha Atomic Research Center (BARC) Director Dr. Srikumar Banerjee and several senior members of the BARC staff briefed Nuclear Regulatory Commission (NRC) Chairman Klein and delegation on activities at BARC, and provided a tour of the Dhruva reactor, Engineering Research Hall 7, and the Waste Immobilization Plant. Much of the engineering research is focused on technology circa 1950-1970, though BARC is conducting some advanced material and chemistry research. New on-site construction may be for the Advanced Heavy Water Reactor (AHWR). Security at the site was moderate.

BARC ACTIVITIES

¶2. (C) During a hurried PowerPoint presentation, Dr. Banerjee indicated that BARC is a single-agency funded organization with approximately 16,000 employees, about 4200 of which are scientists and engineers, at sites in Tarapur, Kalpakkam, Mysore, Srinagar & Gulmarg, Mt. Abu, Guaribidanur, and environmental and seismic labs spread around the country. In the regulatory process, BARC provides technical support to the Atomic Energy Regulatory Board (AERB) on safety, advanced reactor designs, reprocessing and waste management. BARC produces isotopes for the entire country, but because they lack a commercial side, the Board of Radio Isotope Technology

actually markets the isotopes to hospitals and other facilities. The reprocessing facilities at Trombay and Tarapur are active, while the facility at Kalpakkam is currently undergoing upgrades. Both Tarapur and Kalpakkam have interim storage facilities for vitrified waste.

¶3. (C) According to Dr. Banerjee and senior engineers, BARC is conducting on-going research into beryllium refractory metals and alloys, shape memory alloys and components, carbon-based materials, bio-implants, advanced electronics and precision machining. Safety-related research includes equipment for radon monitoring in uranium mines, an online thorium monitor design, tritium monitors, an integrated thermo luminescence/optically stimulated luminescence reader, and a gamma spectral system that can be helicopter-mounted to identify radiation spread in case of an incident.

¶4. (C) One of the senior engineers said that BARC is supporting two desalination projects as well. The first uses a multistage flash process to produce 4.5 million liters/day (MLD) of very pure (20ppm) water, which is mixed with water processed using reverse osmosis (1.6 MLD, 500ppm) to create 6.3 MLD of drinking water. The second is a non-nuclear barge that produces 40 KLD of water.

¶5. (C) Reactor Safety manager Sakushwa indicated that every nuclear power plant is equipped with a tritium monitoring station. In addition, 80 solar-powered stations in the Indian Environment Radiation Monitoring Network (IERMON) report gamma radiation levels via a GSM network once daily. In case of an emergency or detection, the stations report back every 5 minutes.

POWER PLANT PLANS AND THE AHWR

¶6. (C) Dr. Banerjee pointed out that India has 15 operating Pressurized Heavy Water Reactors (PHWR) with three more under construction, two operating Boiling Water Reactors (BWR), and two Vodo-Vodyanoi Energetichesky Reactors (VVER) under construction. By 2020, India plans to add an additional eight PHWRs (700MWe), four Fast Breeder Reactors (FBR) (500Me), an unknown number of Light Water Reactors (size and number to be determined by foreign investment), and one Advanced Heavy Water Reactor (AHWR) (300 MWe). Dr. Banerjee claimed the sodium-cooled, carbide fueled FBR prototype has been operating with no failures at 155,000 MWD/ton.

¶7. (C) The AHWR will be an accelerator-driven system that acquires 65% of its power from thorium and include a 20MeV/30A high-current injector, as described by Dr. Banerjee and the senior engineering staff. The system will use TRISCO-coated particle fuel and a lead-alloy-based coolant. The high temperature reactor (estimated core temperature of 1000 degrees Celsius) will be cooled by a natural circulation system, and the overall design will incorporate several new passive safety elements. The design for the AHWR is completed and fabrication is in process. On the BARC campus just south of the reprocessing and waste plants, SCIOFF noted building structures being erected and active construction activities. When asked, one of the engineers indicated it was for an accelerator that would be fed by the smaller accelerator immediately adjacent, and that construction should be completed in 1-2 years. (NOTE: Given contextual clues and conversations with U.S. technical staff, SCIOFF got the impression this construction site may be for the AHWR rather than an accelerator but was unable to confirm this with BARC officials.)

TOUR AND SECURITY POSTURE

¶8. (S) BARC is situated on a larger access-controlled compound housing offices for AERB and the Department of Atomic Energy (DAE) as well family housing units and associated support structures. At the main BARC entry gate,

security officers collected cell phones, cameras, electronic devices such as memory sticks, and any 'perfumed items' such has hand sanitizer and lotions. They performed a quick, but not thorough, check of the vehicle and bags carried by delegation members. To enter the compound, the delegation was required to provide passports and fill out an information sheet that included name, date and place of birth, passport and visa information, organizational affiliation, address in India and permanent address. Each delegation member was issued pre-printed badge that included their name and organization affiliation, but no picture. All BARC employees SCIOFF observed wore similar badges that included the BARC name, logo and address, the name of facility they work at (i.e. Trombay), their photograph, and their name (some included only first initials last name). The BARC name and work location were printed on a band of color - red, blue and green - which likely indicated access permissions though it was unclear what each color meant. (NOTE: The same exact style of badge with changed company information and a different color stripe were observed on NPCIL employees at the Kaiga nuclear facility. END NOTE) It was not clear what type of badges, if any, were worn by construction personnel.

¶9. (S) At the entry gate, and seen driving around the compound on two occasions, were members of an unidentified

security force. Wearing olive-drab uniforms and carrying either shotguns or what appeared to be fully or semi-automatic Russian-type rifles, they had a patch on their left shoulder that included the atomic symbol surrounded by Hindi words which SCIOFF was unable to identify. These same guards were also present at the security desks for all of the buildings the delegation toured. The delegation was transported in BARC-provided vehicles - one car and one bus - from the IAEA conference and through the duration of the tour.

¶10. (S) The tour began and ended in the administrative building, a hexagon-shaped building just northwest of the reactors. In the morning the delegation met in a conference room for a PowerPoint briefing, and after the tour was complete we met on the top floor for lunch with Dr. Banerjee, the senior engineers, and French regulatory officials who were also visiting BARC as during the IAEA Safeguards Conference. The top floor also has a balcony which looks out over most of the BARC Facility.

¶11. (S) The delegation was first taken into the Dhruva Research Reactor. The building did not have any visible external security systems, and there were no turnstiles or other security barriers for entry. In the front lobby, a security desk with two guards required the delegation to leave purses and bags for the duration of the building tour, and appeared to be checking badges for personnel entering the building. SCIOFF observed no cameras in the front exterior, lobby or reactor areas of the building and the security desk did not appear to have any security camera monitors. After a briefing by the building manager on the layout and operations of the reactor using a scale-model located in the building's lobby, the delegation was led by a set of metal turnstiles requiring badge scan and pin-code to access (though the delegation entered through a glass side door that was held open), by a walk-through personnel radiation detector, and into an airlock to access the reactor. The only security camera observed in the building was pointed at the outside airlock door, and a second security booth with reflective glass was immediately adjacent to the turnstiles. The reactor, a single containment vessel, appeared to be well maintained and the surrounding equipment in good working order if somewhat dated technology. The building overall was clean, though some of the student experiments and accompanying poster boards appeared to have collected dust. SCIOFF noted a back bay door labeled for vehicular access.

¶12. (S) BARC engineers indicated to SCIOFF during the tour that Dhruva was currently operating at 400Kw, less than half

of capacity, because of the shortage of uranium fuel. The reactor had about 35 ports for nuclear research related to chemistry and materials (SCIOFF was not able to count them, but did observe several experiments and unused ports around the reactor) and experiments could also be put directly into the reactor. Students came from all over India, particularly from IIT Bombay, and were not associated with BARC other than their use of the reactor. No students were present during the tour, and only one employee, a maintenance worker, entered the reactor area while the delegation was present. The delegation was then led back through the airlock into the analog-technology reactor control room, a glass-walled room entered through the reactor side of the turnstiles, and out of the building.

¶13. (S) Hall 7, the next site visited, was said by the director to be for engineering research activities including

circulation, coolant tube replacement, fuel replacement, and other technologies. The large non-air-conditioned, three story warehouse contained numerous scale-models, equipment, and materials - much of it dusty, broken or in packing crates - and a few potentially operational pieces. U.S. Technical staff commented that the equipment and technology in the warehouse was equivalent to and sometimes based on U.S. technology from the 1950,s-1970,s, and that they could see no new, innovative, or state-of-technology research being conducted in the building. Hall 7 had very little security, though a guard in a security desk at the lobby entrance appeared to be checking badges. A message board posted in the entrance carried the designation PPED/F/B/BK/37.

¶14. (S) The final stop on the tour was the Waste Immobilization Plant, located at the north end of the compound immediately adjacent to the reprocessing facility. This was the only building the delegation visited that had external barbed-wire fencing with an apparent guard shack at the compound entrance, though no guards were present when we entered. At the building entry, a guard at a security desk similar to those in the other buildings checked badges, though we were allowed to keep purses and bags during the tour. No security cameras were visible in the lobby area. We were led down a hall to see two of the hot cells used in the waste vitrification process - specifically where the lids were welded on to the filled casks. All operations were conducted behind 1m thick walls, with thick glass windows. For better visibility and less distortion, the windows included a layer of oil that was bubbled with an unspecified gas to keep it clear. The window to the welding area included a set of manipulator arms, and right next to that window was a servo-manipulator work station that included cameras internal to the hot cells to watch and record the process. Dr. Banerjee said that this was one of three such plants in the country, and that the facilities only process waste from the PHWR reactors, not the BWR reactors; BWR reactor waste goes directly to storage. The Trombay facility only processes waste from the research reactors, and processed waste is sent to Tarapur for storage for 30-50 years. Operators receive about two years of training before being allowed to operate the machinery.

COMMENT

¶15. (S) The BARC officials stayed focused on civil side of their activities, and did not discuss any activities related to nuclear weapons development or assembly, or plutonium reprocessing. This unprecedented official access to the BARC facility is due in large part to NRC Chairman Klein's status and the positive US/India momentum since the signing of the 123 agreement. BARC plans to continue technical exchanges with the NRC and other U.S. Technical agencies. END COMMENT

¶16. (U) The NRC delegation has cleared this cable.
WHITE